

WE CLAIM:

1. A method of manufacturing a microcellular polyurethane foam comprising the steps of:

selecting an isocyanate-terminated prepolymer containing less than 12% functionality;

5 preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action tin catalyst wherein said water comprises between 1% and 5% by weight of said curative component; and

10 mixing said curative component with said isocyanate-terminated prepolymer at a functional group (NCO/OH) ratio of about 1:1, provided that if said isocyanate-terminated prepolymer is present in excess relative to said curative component, the maximum percentage of said excess is 2%.

2. The method of claim 1 further comprising the step of dispensing the reactive mixture into a mold to cure.

3. The method of claim 2 further comprising the step of maintaining a mold temperature of about 160°F to about 200°F.

4. The method of claim 2 wherein the mold is configured to form a solid circular tire for attachment to a hub of a bowling ball lift wheel.

5. The method of claim 2 wherein the mold is configured to form a solid circular tire for attachment to a molded solid cast elastomer, which is attached to a steel roller for use as a zero crush roll in the manufacturing process for producing corrugated board-stock.

6. The method of claim 1 further comprising the step of preheating the prepolymer prior to the introduction of the curative component.

7. The method of claim 1 further comprising the step of injecting a gas into the mixture of the curative component of the prepolymer.

8. The method of claim 1 wherein the isocyanate-terminated prepolymer has an isocyanate concentration of less than about 10%.

9. The method of claim 1 wherein the water concentration is between about 1.5 to about 3% by weight of the curative component.

10. The method of claim 1 wherein the foam surfactant concentration is above about 1% of the curative component.

11. The method of claim 1 wherein the ratio of tin catalyst to standard solid cast polyurethane catalyst in the catalyst component is about 1.25:1.

12. The method of claim 1 wherein the catalyst component concentration is between about 0.5 to about 0.6% of the curative component.

13. The method of claim 1 wherein the NCO to OH ratio is between about 0.96 and 1.02.

14. The product manufactured according to the method of claim 1.

15. A method of making a solid circular tire for attachment to a hub of a bowling ball lift wheel, comprising the steps of:

configuring a mold to a shape defining a solid circular tire for attachment to a hub of a bowling ball wheel lift;

selecting an isocyanate-terminated prepolymer containing less than 12% functionality;

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preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action tin catalyst wherein said water comprises between 1% and 5% by weight of said curative component;

mixing said curative component with said isocyanate-terminated prepolymer at a functional group (NCO/OH) ratio of about 1:1, provided that if said isocyanate-terminated prepolymer is present in excess relative to said curative component, the maximum percentage of said excess is 2%; and

molding the mixture thus produced in said mold.

16. The product manufactured according to the method of claim 15.

17. A method of making and using a solid circular tire, comprising:  
configuring a mold to a shape defining a solid circular tire;  
selecting an isocyanate-terminated prepolymer containing less than 12% functionality;

preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action tin catalyst wherein said water comprises between 1% and 5% by weight of said curative component;

mixing said curative component with said isocyanate-terminated prepolymer at a functional group (NCO/OH) ratio of about 1:1, provided that if said isocyanate-terminated prepolymer is present in excess relative to said curative component, the maximum percentage of said excess is 2%;

molding the mixture thus produced in said mold;

attaching the solid circular tire thus formed to a molded solid cast elastomer; and

attaching said molded solid cast elastomer to a steel roller for use as a zero crush roll in the manufacturing process for producing corrugated board-stock.

18. The product manufactured according to the method of claim 17.

19. The method of claim 1 further comprising the step of applying pressure to one or both of the components during processing.

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